Atlantic Middle Jurassic Clastic (AMJ C1) Play

***Gonyaulacysta pachyderma* and *Gonyaulacysta pectinigera* biozones**

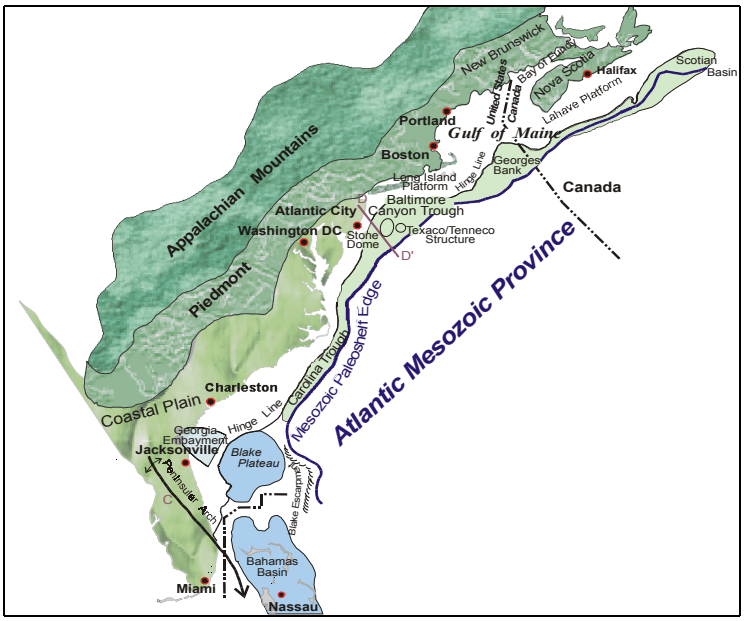


Figure 1. Physiographic map of the Atlantic Margin.

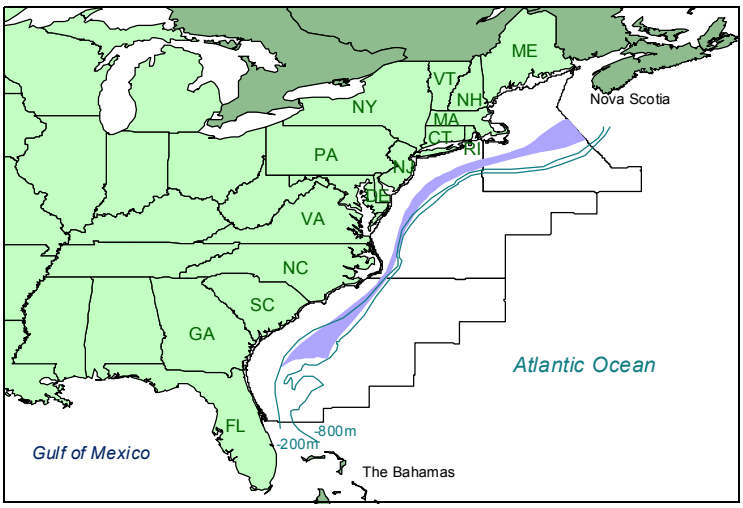


Figure 2. Play location.

Play Description

The frontier Atlantic Middle Jurassic Clastic (AMJ C1) play occurs within the *Gonyaulacysta pachyderma* and *Gonyaulacysta pectinigera* biozones. This play extends from the U.S.-Canadian border through the Carolina Trough to the Blake Plateau (figures 1 and 2).

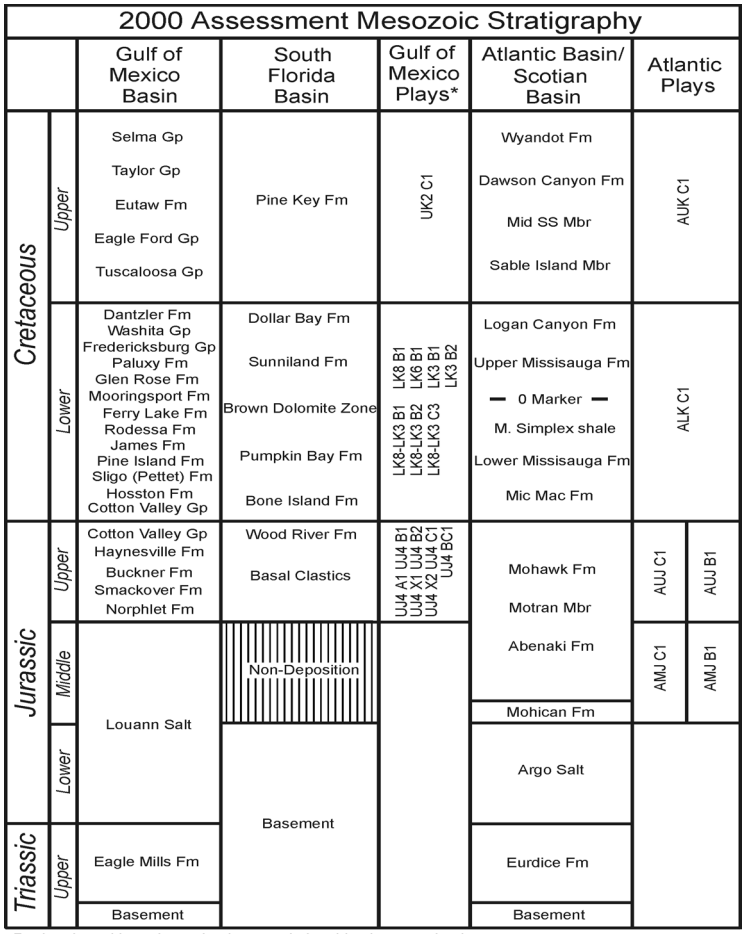
The updip assessment limit is the shoreward erosional limit of middle Jurassic sediments. Downdip, middle Jurassic siliciclastics exhibit a facies change to platform carbonates of the Atlantic Middle Jurassic Carbonate (AMJ B1) play.

The AMJ C1 play is stratigraphically and structurally similar to the Atlantic Lower Cretaceous Clastic (ALK C1) and to the Atlantic Upper Jurassic Clastic (AUJ C1) plays.

Play Characteristics

During the middle Jurassic, clastic sediments were eroded from the Appalachian Mountains and were deposited on the Atlantic Margin shelf. Delta complexes prograded across the shelf and, where clastic sediment influx was great enough, fans were deposited on the slope. Potential upper Jurassic reservoirs were deposited in delta complexes, barrier bars, and channel systems on the shelf, and in fan complexes on the slope.

Trapping structures include mainly anticlines, growth faults, and normal faults. Potential source rocks include Jurassic shelf and slope shales, though Jurassic lagoonal and platform carbonates may also provide potential source rocks. Geochemical analysis indicates organic matter to be primarily Type III with total organic carbon (TOC) ranging from 0.5 to 3 percent. The hydrocarbon evolution window extends from approximately 7,000 to 18,000 feet. Seals are provided by middle or lowermost upper Jurassic limestones or by overlying



Rock unit positions do not imply age relationships between basins.
* Does not include plays that span ages.

Figure 3. Mesozoic stratigraphy of the Gulf of Mexico and Atlantic Margins.

AMJ C1 Play Marginal Probability = 0.90	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	0	0.000	0.000	0.000
Cumulative production	–	0.000	0.000	0.000
Remaining proved	–	0.000	0.000	0.000
Unproved	0	0.000	0.000	0.000
Appreciation (P & U)	–	0.000	0.000	0.000
Undiscovered Conventionally Recoverable Resources				
95th percentile	–	0.000	0.000	0.000
Mean	120	0.399	4.891	1.269
5th percentile	–	0.645	8.455	2.020
Total Endowment				
95th percentile	–	0.000	0.000	0.000
Mean	120	0.399	4.891	1.269
5th percentile	–	0.645	8.455	2.020

Table 1. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

shales.

Discoveries

Exploration along the Atlantic Margin Federal OCS Area consists of 46 exploration and 5 COST wells. Of the two wells that may have penetrated the AMJ C1 play, no commercial quantities of hydrocarbons were found.

Analogs

Since the AMJ C1 play contains no Federal fields, productive upper Jurassic clastic sediments of the onshore eastern Gulf of Mexico and of the Canadian offshore Scotian Basin provide the analogs for input parameters used in this assessment (figure 2).

The eastern Gulf of Mexico and the Atlantic Continental Margin shared similar depositional environments and a common source area during the upper Jurassic. The onshore upper Jurassic clastic analog comprises the Smackover Formation and Cotton Valley Group of Mississippi and Alabama (figure 3). This analog encompasses an area of 6.2 million acres (9,750 square miles). Exploration in the analog area has a success rate of approximately 10 percent, and drilling is at a mature stage with approximately 60 to 90 percent of the analog being explored. These analog fields contain an average of 40 percent oil, 29 percent gas, and 31 percent mixed hydrocarbons. Fields producing from the well-established Norphlet trend were not used as analogs in this assessment because they produce from eolian sands that are not comparable to the deltaic and fan deposits in the AMJ C1 play.

The Scotian Basin upper Jurassic clastic analog comprises the Mic Mac Formation (figure 3) and covers an area of 35 million acres (54,700 square miles). Exploration in this analog area has a success rate of approximately 30 percent, and drilling is at an immature stage with approximately 30 percent of the ana-

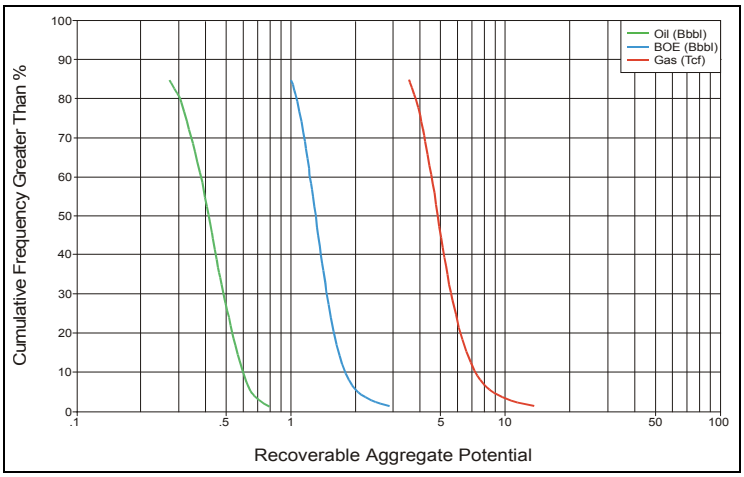


Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

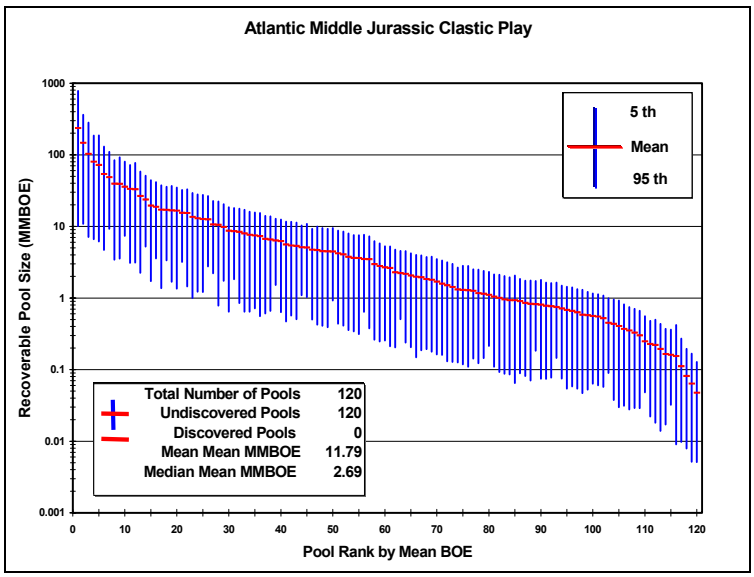


Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

log area being explored. This analog was used primarily for field size distribution parameters because production data are not available.

Assessment Results

The marginal probability of hydrocarbons for the AMJ C1 play is 0.90. Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) range from zero at the 95th percentiles to 0.645 Bbo and 8.455 Tcfg at the 5th percentiles (table 1; figure 4). Mean UCRR are forecast to be 0.399 Bbo and 4.891 Tcfg (1.269 BBOE). These undiscovered resources might occur in as many as 120 pools. These pools have an unrisked mean size range of <1 to 237 MMBOE (figure 5) and an unrisked mean mean size of 12 MMBOE.

Potential for discoveries extends from the U.S.-Canadian border through the Carolina Trough to the Blake Plateau (figure 2).